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ABSTRACT

A 56-item rating scale of research and evaluation competencies for vocational educators was developed. Four skill categories were included: (1) reviewing and analyzing completed research; (2) conducting research; (3) conducting evaluation; and (4) managing research and evaluation activities. Respondents were asked to rate each of the items, ranging from very important to not important. The questionnaire was mailed to the groups of vocational classroom teachers, vocational administrators and supervisors, county vocational directors, vocational teacher educators and researchers. The overall rate of questionnaire return was 67%. The mean score for 17 of the competencies was not significantly different; these skills were considered to be common requirements for the various groups. Many of the remaining 39 competencies could also be considered common requirements, since statistical differences between these two groups were slight. Analyses regarding the order of importance of acquiring these skills suggested that those skills named by local school district personnel were of primary importance; skills in research design and statistical analysis could be acquired later. Implications for competency based training programs are briefly discussed.
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Research and Evaluation Competencies

Needed by Vocational Educators¹

Ermine M. Owenby²

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Hollie B. Thomas

The implication that may be drawn from the findings of the Committee on Vocational Education Research and Development (COVERD) (1976) is that vocational education researchers have been, for various reasons, unable to provide evidence of having an impact on student learning. Although COVERD did not include the competency of the researchers as being one of these reasons, Larson and Valentine (1975) did. They asserted that poorly answered and unanswered questions limit the effectiveness and efficiency of vocational education at all levels. Popham (1974) indicated that conclusions based on faulty research or evaluation may seriously damage program participants as well as future generations. Copa (1974) noted that the evaluation and research skills of vocational educators must improve if information that will establish accountability is to be available. Thus questions are raised concerning the research and evaluation skills needed by the various groups of vocational educators; i.e., what research and evaluation skills are needed to answer the questions that limit the efficiency and effectiveness of vocational education programs and which vocational educators need these skills. The answers to the questions of

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what knowledge and skills are needed by educational researchers in general has been addressed by Worthen et al (1971) and Worthen (1975), thus providing a point of departure to approach the questions posed.

Purpose of the Study

The purpose of the study was to identify the research and evaluation competencies needed by vocational teachers, local vocational administrators and supervisors, county vocational directors, teacher educators, and vocational researchers and evaluators. A secondary purpose was to determine the similarities and differences in the level of importance of the identified competencies for members of the various groups.

Instrumentation

The instrument used in this study was a list of research and evaluation competencies. This list was developed from the literature, the primary sources being Worthen and Gagné (1969) and Worthen (1975). The competencies developed by these authors were identified and validated through interviews with employees and supervisors of research and evaluation personnel. The competencies thus identified were screened to include only those related to research and evaluation, i.e., competencies relating to development and diffusion were systematically excluded. Some competencies were rewritten and others added to make the competency list more specific to vocational vocational education research and evaluation. Because of these revisions it was considered necessary to submit the list to a jury of experts to establish content validity. The recommendations of the jury were incorporated into the final version of the instrument which contained 56 competencies.

The 56 items were grouped into the categories of (1) reviewing and

analyzing completed research, (2) conducting research, (3) conducting evaluation, and (4) managing research and evaluation activities. No headings were included on the instrument. The respondents were asked to rate each competency as to its importance in performing the duties of their position. A six-point scale ranging from (1) very important to (6) not important was provided.

Data Source

The population identified for the study included vocational classroom teachers, vocational administrators and supervisors, county vocational directors, vocational teacher educators from the State of Florida, and a select group of national research personnel. A random sample of teacher educators was obtained, while a purposive sample of all other groups was identified. The intended use of the results, i.e., the identification of competencies possessed and/or needed by competent incumbents of the positions under study, constitutes the rationale for this procedure. Because of the size of the teacher educator population the researchers were unwilling to identify a purposive sample of those considered to be doing exemplary work in research and evaluation, and thus excluding others. The vocational teachers were identified by their respective State Department of Education program administrators; the county supervisors and vocational administrators by county vocational directors; and county vocational directors and the national research group by the researchers.

Data were collected by mailed questionnaire. Subjects not responding to the first questionnaire were mailed a follow-up letter and a second questionnaire.

Methods

Internal consistency coefficients, means, rank order correlation coefficients, and one-way analyses of variance were computed. Where significant differences were observed ($P < .05$) among the mean item responses for the various groups in the analysis of variance, the Newman-Kuels technique of multiple comparisons (Winer, 1962) was employed. The means of each group were used to determine the degree of importance of each competency. The mid-point (3.5) of the six-point response scale was arbitrarily established as the critical point for determining whether or not a competency was important for the performance of the duties of the group. Competencies having a mean rating below the mid-point (i.e., greater than 3.5) were considered unimportant for satisfactory performance.

Results and Discussion

As shown in Table 1, the return rate ranged from a low of 58 percent for vocational administrators and supervisors to a high of 90 percent for county vocational directors. The return rate for all groups combined was 67 percent.

Table 1
Instrument Returns

Group	Mailed	Returned	%
Vocational Classroom Teachers	88	60	68
Vocational Administrators/Supervisors	72	42	58
County Vocational Directors	20	18	90
Vocational Teacher Educators	21	14	67
National Research Personnel	<u>13</u>	<u>10</u>	<u>77</u>
Totals	214	144	67

Table 2

Item Analysis and Scale Reliabilities

Item #	Item Correlation		Reliability Coefficient	$\bar{r}$ Within Group
	Entire Instrument	Within Group		
Review and Analysis of Research:			.864	.65
1	.327	.711		
2	.583	.614		
3	.377	.701		
4	.061	.271		
5	.524	.697		
6	.491	.724		
7	.555	.711		
Conducting Research:			.969	.75
8	.714	.719		
9	.754	.775		
10	.799	.807		
11	.756	.775		
12	.809	.815		
13	.770	.814		
14	.692	.717		
15	.767	.813		
16	.752	.826		
17	.778	.853		
18	.777	.839		
19	.775	.812		
20	.772	.856		
21	.456	.505		
22	.402	.411		
23	.739	.813		
24.	.689	.733		
25	.678	.700		
26	.676	.675		
27	.684	.629		
28	.620	.667		
29	.750	.727		
30	.730	.700		
33	.751	.741		
36	.684	.616		

Table 2 (continued)

Item #	Item Correlation		Reliability Coefficient	$\bar{r}$ Within Group
	Entire Instrument	Within Group		
Conducting Evaluation:			.921	.65
31	.641	.443		
32	.621	.612		
33	.441	.537		
34	.294	.521		
35	.544	.641		
36	.434	.560		
37	.305	.606		
38	.577	.671		
39	.524	.654		
40	.515	.762		
41	.321	.601		
42	.527	.766		
43	.470	.659		
44	.512	.741		
45	.460	.581		
46	.600	.718		
Management of Research and Evaluation Activities:			.907	.70
47	.628	.683		
48	.704	.756		
49	.583	.656		
50	.654	.689		
51	.661	.678		
52	.670	.675		
53	.802	.760		
54	.793	.719		

Coefficients of internal consistency were calculated for the categories of (1) reviewing and analyzing completed research, (2) conducting research, (3) conducting evaluation, (4) managing research and evaluation activities, and (5) the total. These coefficients were .86, .97, .92, .91, and .97 respectively. As shown in Table 2, the correlations of each item with the total (with the respective item removed) of the competency category and each item with the entire instrument averaged were .65, .75, .65, .70, and .62 respectively.

When the critical point selected as the cutoff was applied to the means of the various groups, five competencies were found to be unimportant to the performance of the duties of teachers in vocational education programs, while one item was considered unimportant for the performance of the duties of vocational administrators and supervisors. As shown in Table 3, all 56 items were considered to be important for the performance of the duties of county vocational directors, vocational teacher educators, and the national research personnel. Competencies rated unimportant by teachers and vocational administrators were related to the use of statistical analyses. An inspection of the categories of items rated high by the various groups revealed that the highest rated items for the teacher, supervisor, and director groups were those relating to conducting evaluation, while those rated highest by teacher educators and the national research group were those relating to conducting research. The converse was true for the lowest rated items, i.e., teachers, administrators, and directors rated items relating to conducting research lower whereas teacher educators and research personnel rated evaluation competencies lower.

The 17 competencies for which the mean score was not significantly different ($P > .05$) can be considered to be common requirements for the

Table 3

Importance Ratings of Competencies by Research and Evaluation Personnel

Rank Avg. Mean	Item	Competency	Rank/Mean/(Sig. Pairs)					F Ratio
			Voc. Teachers (1) N=60	Voc. Adm., Supvisors Coordntrs (4) N=42	County Voc. Dir. (5) N=18	Teacher Educ. (6) N=14	Nat'l Rchs. (7) N=10	
1 1.8517	45	State objectives in measurable terms.	2.0 1.867	6.5 1.903	16.0 1.889	10.5 1.500	24.5 2.100	.534
2 1.8804	43	Assess the value and feasibility of program goals.	3.0 1.949	4.5 1.871	6.0 1.611	37.5 2.071	15.5 1.900	.483
3 1.9127	40	Utilize evaluation results to plan changes in vocational programs.	6.5 1.983	1.0 1.677	1.5 1.389	43.5 2.214	33.5 2.300	2.011
4 1.9332	30	Interpret and draw appropriate conclusions from data analysis.	26.0 2.712 (7,6,5)	16.5 2.200	12.5 1.883 (1)	15.0 1.571 (1)	2.0 1.300 (1)	4.155**
5 1.9350	31	Select an evaluation design appropriate for programs of vocational education.	18.0 2.600	10.5 2.000	16.0 1.889	27.5 1.786	4.5 1.400	3.181
6 1.9426	7	Draw accurate conclusions or inferences from research reports.	16.0 2.559	10.5 2.000	25.5 2.167	10.5 1.500	7.5 1.500	3.069
7 1.9460	10	Clearly state the problem and rationale for research or evaluation.	24.5 2.750 (6,7)	18.0 2.226	23.5 2.111	2.5 1.143 (1)	7.5 1.500 (1)	5.188***
8 1.9684	29	Translate data analyses into recommendations for action.	29.0 2.883 (7,6,3)	14.0 2.129	16.0 1.889 (1)	17.5 1.643 (1)	2.0 1.300 (1)	5.189***
9 1.9698	11	Correctly state hypotheses or clearly state questions to be answered from research.	24.5 2.750 (6)	20.5 2.323	28.5 2.333	2.5 1.143 (1)	2.0 1.300	6.178***
10 2.0269	4	Gather information from colleagues and other informal sources.	4.0 1.967	16.5 2.200	18.5 1.944	33.0 1.924	24.5 2.100	.333
11 2.0405	46	Identify standards or norms for judging the worth of vocational programs.	10.0 2.166	8.5 1.968	6.0 1.611	31.0 1.857	45.0 2.600	1.765
12 2.0436	44	Determine discrepancies between actual and intended program outcomes.	9.0 2.100	13.0 2.097	9.5 1.778	41.0 2.143	24.5 2.100	.355
13 2.0717	42	Identify intended and unintended outcomes of vocational programs.	6.5 1.983	4.5 1.871	12.5 1.833	37.5 2.071	45.0 2.600	.904
14 2.0734	9	Identify and clearly state a researchable topic.	34.0 3.000 (6)	31.0 2.613 (6)	23.5 2.111	2.5 1.143 (1,4)	7.5 1.500	6.934***

* Significant at .05 level
 ** Significant at .01 level
 *** Significant at .001 level

Table 3 (continued)

Rank Avg. Mean	Item	Competency	Rank/Mean/(Sig. Pairs)					F Ratio
			Voc. Teachers (1) N=60	Voc. Adm., Supvisors Coordntrs (4) N=42	County Voc. Dir. (5) N=18	Teacher Educ. (6) N=14	Nat'l Rschs (7) N=10	
15 2.0812	33	Conduct student follow-up studies.	8.0 2.017	12.0 2.065	6.0 1.611	43.5 2.214	40.5 2.500	.992
16 2.0998	28	Report findings of research or evaluation (written and oral) in appropriate style and form for intended audience.	31.0 2.933 (7,6,5)	26.5 2.452	20.0 2.000 (1)	22.5 1.714 (1)	4.5 1.400 (1)	4.782***
17 2.1568	47	Identify potential sources for submitting proposals.	19.5 2.650	30.0 2.546	21.5 2.000	27.5 1.786	13.5 1.800	2.519
18 2.1649	14	Identify the population for a research study.	33.0 2.967 (6)	22.5 2.355	31.0 2.389	5.5 1.214 (1)	13.5 1.900	5.497***
19 2.1660	32	Implement an evaluation design for vocational education programs.	15.0 2.533	2.5 1.871	12.5 1.883	41.0 2.143	38.0 2.400	1.914
20 2.1757	48	Write proposals including estimates of time, man and financial resources required.	27.0 2.783 (6)	26.5 2.452	21.5 2.000	17.5 1.643 (1)	20.0 2.000	3.176*
21 2.1850	15	Select and use appropriate sampling technique(s).	32.0 2.949 (6,7)	24.5 2.419	33.5 2.500	8.0 1.357 (1)	11.0 1.700 (1)	5.074***
22 2.1934	34	Conduct employer follow-up studies.	5.0 1.950	15.0 2.161	3.5 1.556	49.5 2.500	50.0 2.800	2.393
23 2.2166	41	Evaluate learner performance in vocational subjects.	1.0 1.750 (7)	8.5 1.968 (7)	7.0 1.722 (7)	41.0 2.143 (7)	56.0 3.500 (5,1,4,6)	5.118***
24 2.2668	39	Prepare written evaluation reports of vocational programs.	21.0 2.661	6.5 1.903	3.5 1.556	53.5 2.714	40.5 2.500	3.684
25 2.3345	37	Evaluate vocational education instructors.	11.0 2.267 (7)	2.5 1.071 (7)	9.5 1.778 (7)	47.0 2.357	55.0 3.400 (1,4,5)	2.830*
26 2.3376	12	State appropriate assumptions, limitations, and definitions for a research or evaluation project.	37.0 3.100 (6)	28.5 2.516 (6)	44.0 2.833 (6)	5.5 1.214 (1,4,5)	20.0 2.000	7.732***
27 2.3476	8	Determine the type of research (descriptive, correlation, experimental, etc.) that should be utilized.	43.0 3.288 (6,7)	46.5 3.079 (6,7)	30.0 2.353	10.5 1.500 (4,1)	7.5 1.500 (4,1)	8.366***
28 2.3790	27	Read and interpret computer printouts.	44.5 3.300 (6,5)	22.5 2.335	12.5 1.833 (1)	31.0 1.857 (1)	33.5 2.300	6.410***

Table 3 (continued)

Rank Avg. Mean	Item	Competency	Rank/Mean/(Sig. Pairs)					F Ratio
			Voc. Teachers (1) N=60	Voc. Adm., Supvisors Coordntrs (4) N=42	County Voc. Dir. (5) N=18	Teacher Educ. (6) N=14	Nat'l Reschs (7) N=10	
29 2.3548	6	Synthesize the results of research studies.	23.0 3.083 (4,6,7)	32.0 2.677 (1)	47.5 2.944	27.5 1.786 (1)	11.0 1.700 (1)	5.340***
30 2.3649	3	Use library resources (Index, Reader's Guide, card catalog, CIJE, etc.)	14.0 2.457 (6)	43.0 2.968 (6)	51.5 3.056 (6)	2.5 1.143 (1,4,5,7)	28.5 2.200 (6)	6.279***
31 2.4144	49	Utilize management and planning systems such as PERT.	36.0 3.034 (6)	40.0 2.871	23.5 2.167	35.0 2.000 (1)	20.0 2.000	3.867**
32 2.4145	36	Participate as a member of an evaluation consulting team.	12.0 2.367	24.5 2.419	32.0 2.444	52.0 2.643	28.5 2.200	.207
33 2.4152	17	Establish instrument reliability and validity.	39.0 3.133 (6)	28.5 2.516	35.0 2.556	13.5 1.571 (1)	33.5 2.300	3.485**
34 2.4384	53	Implement a management plan that will get a research project started in an efficient manner.	35.0 3.033	46.5 3.097	28.5 2.333	34.0 1.929	13.5 1.800	3.644
35 2.4413	35	Utilize a consulting team in evaluating vocational programs.	13.0 2.382	20.5 2.323	18.5 1.944	55.0 2.857	49.0 2.700	1.067
36 2.4452	54	Terminate a research project including appropriate fiscal management and the delivery of required reports.	42.0 3.250 (6)	39.0 2.833	33.5 2.500	17.5 1.643 (1)	20.0 2.000	4.593**
37 2.4486	1	Locate journals that publish research reports in your field.	22.0 2.667 (6)	33.5 2.710 (6)	51.5 3.056 (6)	10.5 1.500 (1,4,5)	33.5 2.300	3.340**
38 2.4625	22	Review and select appropriate standardized tests or instruments.	17.0 2.567	35.0 2.710	38.0 2.722	22.5 1.786	45.0 2.600	1.470
39 2.4831	13	Select, fully describe and carry out appropriate research design to answer research questions or test hypotheses.	50.5 3.467 (6)	36.5 2.774 (6)	45.4 2.889 (6)	7.0 1.286 (1,4,5)	20.0 2.000	8.072***
40 2.4933	38	Conduct cost, cost benefit, and cost effectiveness analyses of vocational programs.	28.0 2.816 (5)	19.0 2.290 (5)	1.5 1.389 (1,4,6,7)	56.0 3.071 (5)	51.5 2.900 (5)	4.882***
41 2.4967	5	Identify, abstract, review and evaluate research reports and articles reporting research in your field.	30.0 2.898 (6)	33.5 2.710	45.4 2.889	27.5 1.786 (1)	28.5 2.200	2.390

performance of the duties of the various groups. In addition, many of the remaining 39 competencies could be considered to be common to the various groups. For an additional 17 competencies the difference between the mean for the group that rated the competency the highest was within one and one-half scale points of the mean for the group that rated the competency the lowest. Thus, while a statistical difference was found, no practical difference was observed for these competencies.

The rank order correlation coefficients between the order of importance of the competencies as ordered by the ascending order of mean ratings given by the various groups ranged from .86 to -.29. As may be observed in Table 4 the relationships in the order of importance of the competencies were high among the local school district personnel ($\rho = .66$ to .86) and between the national research group and the teacher educators ($\rho = .59$).

Table 4
Rank Order Correlations Between Respondent Groups

Group	1	4	5	6	7
1. Vocational Classroom Teachers	1.00	.81***	.66***	-.23	-.05
4. Vocational Administrators/Supervisors	1.00	.86***	-.11	.10	
5. County Vocational Directors		1.00	-.29	.04	
6. Vocational Teacher Educators			1.00	.59***	
7. National Research Personnel					1.00

***Significant at .001 level of significance.

These findings, which are consistent with those obtained from the comparison of the means for the various groups, suggest that the order these skills

Table 3 (continued)

Rank Avg. Mean	Item	Competency	Rank/Mean/(Sig. Pairs)					F Ratio
			Voc. Teachers (1) N=60	Voc. Adm., Supvisors Coordntrs (4) N=42	County Voc. Dir. (5) N=18	Teacher Educ. (6) N=14	Nat'l Rachs (7) N=10	
42 2.5983	16	Recognize and/or control threats to internal and/or external validity of experimental and quasi-experimental studies.	49.0 3.416 (6)	49.5 3.226 (6)	41.0 2.778 (6)	13.5 1.571 (1,4,5)	20.0 2.000	6.516***
43 2.6198	21	Construct and use instruments and techniques to assess cognitive skills.	19.5 2.650	45.0 3.000	41.0 2.778	37.5 2.071	45.0 2.600	1.428
44 2.6509	51	Conduct research that involves human subjects in an ethical fashion.	38.0 2.117	36.5 2.774	41.0 2.778	45.4 2.286	33.5 2.300	1.384
45.5 2.6563	23	Select and use appropriate method for statistical analysis of data.	56.0 4.347 (7,6)	41.0 2.903	37.0 2.611	22.5 1.714 (1)	11.0 1.700 (1)	5.933***
45.5 2.6563	50	Monitor programs to detect deviations from design or procedures.	41.0 3.183	38.0 2.806	27.0 2.278	53.5 2.714	33.5 2.300	1.953
47 2.7630	56	Construct and use instruments and techniques to assess psychomotor skills.	40.0 3.150 (6)	48.0 3.129 (6)	53.5 3.222 (6)	22.5 1.714 (4,1,5)	45.0 2.600	3.368*
48 2.7787	18	Control extraneous variables in experimental research.	50.5 3.467 (6)	49.5 3.266 (6)	47.5 2.944	31.0 1.857 (4,1)	38.0 2.400	4.346**
49 2.7790	20	Construct appropriate instrument for measuring variables.	48.0 3.389 (6)	52.0 3.290	49.0 2.944	37.5 2.071 (1)	28.5 2.200	3.352**
50 2.7800	2	Use the ERIC system.	47.0 3.388 (6)	51.0 3.233 (6)	55.0 3.235 (6)	17.5 1.543 (1,4,5)	38.0 2.400	6.245***
51 2.8017	24	Use computer related equipment in data preparation & analyses.	52.0 3.617 (6,5)	42.0 2.935	36.0 2.588 (1)	25.0 1.769 (1)	53.0 3.100	5.384***
52 2.8338	55	Construct and use instruments and techniques to assess affective variables.	44.5 3.300 (6)	53.0 3.355 (6)	53.5 3.222 (6)	20.0 1.692 (1,5,4)	45.0 2.600	4.394**
53 2.8500	52	Conduct research projects that conform to legal restraints (e.g., affirmative action).	46.0 3.383	44.0 2.968	41.0 2.778	51.0 2.571	24.5 2.100	2.517
54 3.0988	25	Prepare data for computerized analyses.	54.0 3.800 (6,5)	54.0 3.387	41.0 2.778 (1)	48.0 2.429 (1)	51.5 2.900	3.843**
55 3.1364	19	Construct and use nominal, ordinal, interval and ratio measurement scales.	55.0 3.850 (6)	56.0 3.613	56.0 3.333	45.5 2.286 (1)	45.0 2.600	5.075***
56 3.1900	26	Select and utilize standardized computer programs.	53.0 3.750 (6)	55.0 3.400	50.0 2.000	49.5 2.500 (1)	54.0 3.300	2.752*

* Significant at .05 level

** Significant at .01 level

*** Significant at .001 level

should be acquired resembles the order provided by the means of the local district personnel, thereby leaving skills in research design and statistical analyses to be acquired as part of the "terminal" degree.

Conclusions

The generalizability of the data and therefore the conclusions are limited by the nature of the sample. Data for four of the five groups were obtained from persons identified as exemplary educators or researchers. Thus considerable credence can be given to ratings of the competencies that each group provided as being those competencies that the incumbents need to possess if they wish to be exemplary--a goal of most training programs is to produce an exemplary product. The comparison of the groups, however, should be interpreted with caution. The results do not differ from what would be expected, i.e., teacher educators and vocational researchers could be expected to rate competencies concerning research high while the expectation for local school district personnel is that evaluation is more important than experimental research and statistical analyses. Given that these expectations were supported also gives a degree of credence to the competencies that are common (i.e., not statistically different) to groups. As noted by Worthen et al (1971), research and evaluation activities share many functions in common--even though researchers and evaluators may not admit it.

The results have implications for those who deliver training programs for local school personnel as well as the preparation of research personnel. It appears that many of the competencies that have been considered to be the province of the research scholar are also needed by local school personnel. These common competencies are primarily those associated with evaluation and those related to both research and evaluation activities.

Thus competencies that are common may be taught to a broad range of students. It is also evident that these common competencies may be required at the undergraduate or masters degree level, i.e., a teacher should not be required to enroll in post-masters work to acquire skills needed by the exemplary teacher or vocational administrators.

The procedures used in this study may have systematically excluded research and evaluation competencies needed by vocational educators. In addition, as noted by Worthen (1975) research and evaluation techniques are not stagnate--competencies needed next year may now be only titilating phrases of research and evaluation rubric. Thus the list offered here is considered a point of departure for the development of a competency-based program. The list should also provide a check list against which vocational educators can compare their own expertise to identify professional development needs.

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